Response to Andresen and Peters

Dear Editor,

We thank Drs. Andresen and Peters for the interest in our recent article (Yang et al., 2010). In their Letter to the Editor, they commented that apart from the activation of TRPV1 in vascular endothelium, which may critically contribute to vessel tone, a more comprehensive view of vanilloids and their TRPV1 actions will be necessary to fully understand the antihypertensive potential of capsaicin. Although this point is well taken, we would re-emphasize the focus of our study. Blood-pressure control is indeed multifactorial, involving neural regulators. Our study primarily examined the impact of capsaicin in chili peppers, on the eNOS expression/activity and endothelial function. Endothelium-derived NO, a critical regulator of vascular homeostasis and blood pressure, benefits vascular function through improving vascular compliance and inhibiting platelet activation, vascular inflammation, and smooth muscle proliferation. Our findings demonstrate that endothelial TRPV1 is an important target for capsaicin-induced vascular benefit without ruling out other contributors.

The present study did not examine possible influence of capsaicin on the sensitivity of arterial baroreceptors. Whether arterial baroreflexes affect long-term blood pressure control is still disputed (Lohmeier et al., 2010; Thrasher, 2006); the cause-and-effect relation between them in hypertension is yet to be established. A recent study shows that acute carotid sinus stimulation reduces ambulatory blood pressure in hypertensive patients (Heusser et al., 2010). An ongoing randomized clinical trial is evaluating long-term effects of baroreceptor stimulation on blood-pressure regulation (http://www.clinicaltrials.gov). It is thus necessary to understand how pharmacological agents might lower blood pressure through baroreflex modulation, especially involving NO. Andresen and Peters also raised that capsaicin at 33 nM may act on TRPV1 receptors in the nervous system and thus lowers blood pressure. We agree that capsaicin may affect central or peripheral nervous systems through activating the TRPV1 receptor. But such a possibility is not seemingly supported by the results under our experimental settings. Oral administration of a single dose of capsaicin produced a transient surge in plasma capsaicin, while 3 week dietary capsaicin did not affect endothelium-dependent relaxation and blood pressure. Seven-month capsaicin administration resulted in ~1 nM in plasma, while intravenous capsaicin caused mixed effects on blood pressure in literature. It therefore needs elucidation whether capsaicin's derivatives could produce similar benefits or capsaicin synergizes with other vasoprotective molecules. Our study indicates that neurogenic CGRP is unlikely to contribute to capsaicin-induced benefit. The long-term impact of dietary capsaicin consumption on the central mechanisms of blood pressure regulation, nevertheless, warrants further investigation.

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